

PATENT ABSTRACTS OF JAPAN

(11)Publication number : **10-069429**

(43)Date of publication of application : **10.03.1998**

(51)Int.CI. **G06F 12/02**

(21)Application number : **09-089497**

(71)Applicant : **FUJITSU LTD
PFU LTD**

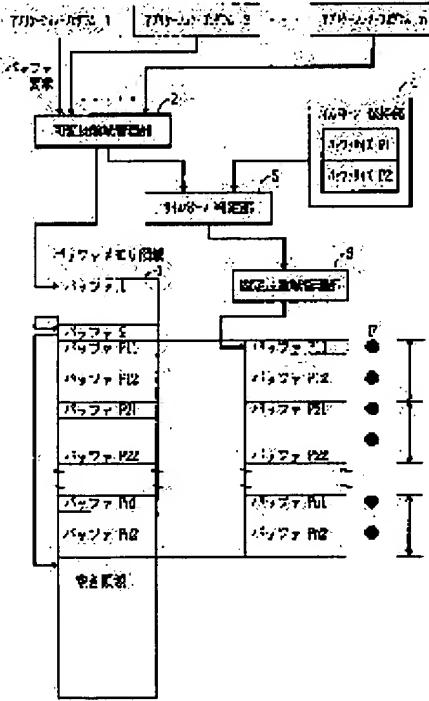
(22)Date of filing : **08.04.1997**

(72)Inventor : **TANABE KOTA
FURUKAWA TOMOAKI**

(30)Priority

Priority number : **08 86096** Priority date : **09.04.1996** Priority country : **JP**

(54) DEVICE AND PROGRAM FOR BUFFER ALLOCATION MANAGEMENT



(57)Abstract:

PROBLEM TO BE SOLVED: To efficiently use a buffer area by comparing a pattern of an allocated area with a pattern in a size pattern holding part, and excluding an allocated buffer memory area from objects of variable-length area management and passing it to a fixed-length area management part when it is decided that those patterns match each other.

SOLUTION: Application programs 1-(n) send buffer acquisition requests to a buffer allocation management program when a buffer becomes necessary. A size pattern holding part 4 holds a size pattern of the size of the buffer. Each time the variable-length area management part 2 allocates a buffer, a size pattern decision part 5 stores the size and compares it with the size pattern in the size pattern holding part 4. The number of stored sizes is matched with the number of sizes held in the size pattern holding part 4 and update is performed while the latest one is only left. When their match is detected, the fixed-length area management part 3 is actuated.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

JPO and NCIPI are not responsible for any
damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] It is buffer allocation management equipment which has the buffer memory field which has a predetermined capacity on memory, and the variable-length field Management Department which assigns and manages the buffer of size according to the demand of an application program from the inside. With the fixed-length field Management Department which manages the part as which it was specified in the buffer memory field as a fixed-length field The size pattern attaching part holding the pattern of the size of a buffer defined beforehand, When the variable-length field Management Department judges that the pattern of the size of a field assigned according to the demand of an application program is in agreement as compared with the pattern of a size pattern attaching part, Buffer allocation management equipment characterized by having the size pattern judging section which removes the assigned buffer memory field from the object of variable-length field management, and is passed to the fixed-length field Management Department.

[Claim 2] It is buffer allocation management equipment characterized by to pass the fixed-length field Management Department the buffer area [finishing / allocation] which it is buffer allocation management equipment according to claim 1, and the size pattern attaching part memorized the buffer size assigned whenever the variable-length field Management Department assigned the buffer, authorized the size pattern judging section as a size pattern when the pattern of the memorized buffer size appeared repeatedly, and suited the size pattern.

[Claim 3] It is the record medium which recorded the buffer allocation manager for making the buffer assignment of a buffer memory field which has the predetermined capacity on memory manage by computer. Make the pattern of buffer size defined beforehand hold, and assign the buffer of size according to the demand of an application program from a buffer memory field, and it is made to manage as a variable-length field. When the pattern of the size of a field assigned according to the demand of an application program is made to compare with the pattern of buffer size with which the above is held and it is judged with coincidence as a result of a comparison, The record medium which recorded the buffer quota manager characterized by making the assigned buffer area manage as a fixed-length field and in which computer reading is possible.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the buffer allocation management equipment which assigns the buffer memory field on memory according to the demand of an application program, and the record medium which recorded the buffer allocation manager and in which computer reading is possible.

[0002]

[Description of the Prior Art] A configuration which gives the buffer of size with which the application program which needs a buffer by the conventional buffer allocation management method to the buffer allocation manager which manages a buffer memory field carried out the buffer acquisition demand, and the buffer allocation manager was demanded is common. As a method which manages a buffer area, divide the memory area of which ** continuation was done, and two or more fixed-length fields are taken. The method which uses each of that field as a buffer, attaches use / intact flag corresponding to each buffer (fixed-length field), and manages a buffer (fixed-length management method: drawing 4 (1)), ** There is a method (variable-length management method: drawing 4 (2)) which will start a required part and will be given from the memory area prepared as a buffer area if there is a demand.

[0003] However, by the fixed-length management method, when a program operates by multitasking, the size of a buffer must be doubled with the application program which requires the largest buffer size. Therefore, in spite of using only small size in the case of most application programs, a buffer size must be made into the greatest size and buffer memory area size will also take it. [large] Therefore, the field of the memory which can be used will be pressed.

[0004] Moreover, in the case of a variable-length management method, by recording degree pointer (and the die length of a field) in which the start address of a buffer memory field is shown by the head pointer V as shown in drawing 5, and the start address of the display flag F in use in the head location of the buffer area started from there and the next field is shown shows a buffer continuously. Therefore, when another application program has required the buffer after assigning many buffers to a long application program which continues carrying out time amount maintenance for the field gained once, although there is no problem which makes a buffer area useless by the variable-length management method, since an empty buffer will be located in the degree of the field assigned once, although an empty buffer area is looked for, it needs to follow a chain, and requires time amount.

[0005] The above mentioned is a problem which appears well, when a communication control program operates in a multitasking environment as an application program.

[0006]

[Problem(s) to be Solved by the Invention] This invention aims at reconciling shortening the time amount of using a buffer area efficiently and buffer allocation by the buffer control partially made into a fixed-length management method by judging the pattern of the size of the buffer demanded on the basis of a variable-length management method.

[0007]

[Means for Solving the Problem] In the buffer allocation management equipment which has the buffer memory field which has a predetermined capacity on memory, and the variable-length field Management Department which assigns and manages the buffer of size according to the

demand of an application program from the inside With the fixed-length field Management Department which manages the part as which it was specified in the buffer memory field as a fixed-length field The size pattern attaching part holding the pattern of the size of a buffer set up beforehand, When the variable-length field Management Department judges that the pattern of the size of a field assigned according to the demand of an application program is in agreement as compared with the pattern of a size pattern attaching part, The size pattern judging section which removes the assigned buffer memory field from the object of variable-length field management, and is passed to the fixed-length field Management Department is prepared.

[0008] Thus, by a variable-length management method's using a buffer memory field without futility to the buffer demand separately demanded by constituting, and removing from variable-length management and shifting to fixed-length management, when it judges that it is the size pattern set up to what takes many buffers by the pattern of fixed size, a field can be too used without futility rather than it decides the whole buffer size from the start. Moreover, the die length which follows the chain of a variable-length buffer when taking the buffer according to individual after that since the field which took many buffers by the same pattern is removed from the range of variable-length management becomes short, and since a free area can be found quickly, it can assign quickly.

[0009] Invention of claim 2 memorizes further the buffer size which assigned the size pattern attaching part whenever the variable-length field Management Department assigned the buffer, and the size pattern judging section is authorized as a size pattern, when the pattern of the memorized buffer size appears repeatedly, and it passes the fixed-length field Management Department the buffer area [finishing / allocation] suitable for a size pattern.

[0010] By doing in this way, an application program has the advantage which does not need to set up a size pattern first. Invention of claim 3 clarifies realizing by the program of a computer.

[0011] Namely, it is the record medium which recorded the buffer allocation manager for making the buffer assignment of a buffer memory field which has the predetermined capacity on memory manage by computer. Make the pattern of buffer size defined beforehand hold, and assign the buffer of size according to the demand of an application program from a buffer memory field, and it is made to manage as a variable-length field. When the pattern of the size of a field assigned according to the demand of an application program is made to compare with the pattern of buffer size with which the above is held and it is judged with coincidence as a result of a comparison, It is the record medium which recorded the buffer quota manager characterized by making the assigned buffer area manage as a fixed-length field and in which computer reading is possible.

[0012]

[Embodiment of the Invention] Drawing 1 is the block diagram of an example and is drawing explaining the configuration and actuation of the buffer assignment management equipment which assigns the buffer which each application program requires in a computer to the field on memory, i.e., a buffer assignment manager.

[0013] To a buffer assignment manager, an application program 1 - n will advance a buffer acquisition demand, if a buffer is needed. The variable-length field Management Department 2 receives those demands, and they carry out layout management to the buffer memory field 1 with the conventional variable-length management method. The size pattern attaching part 4 holds the group (size pattern) of the size of a buffer. These contents can be set up separately. Although drawing 1 shows the example which constitutes a size pattern from two sizes, there may be how many sizes. Whenever the variable-length field Management Department 2 assigns a buffer, the

size pattern judging section 5 memorizes the size, and compares with the size pattern of the size pattern attaching part 4. In addition, what is necessary is just to update the number of the sizes to memorize together with the number of maintenance sizes of a size pattern attaching part, so that it may leave the newest thing. When coincidence is detected, the fixed-length field Management Department 3 is started.

[0014] The case where also refer to the explanation flow chart of the example of drawing 2 of operation and the explanatory view of the example of drawing 3 of operation, and a buffer is hereafter assigned for the example of this invention to one of the application programs and a communication control program is explained.

[0015] In a communication control program, it is necessary to gain two or more fixed-length buffers for usually storing the data for outputting and inputting in a circuit in many cases. Since the maximum of a data length which can transmit at once by the circuit is restricted, it becomes two or more buffers which made the group control/management data, and a transmitted and received data. For example, the magnitude of the whole buffer memory field is about several MB, and one communication control program takes about several KB of about hundreds of buffers.

[0016] Generally, this field is gained, when self is started, and it is released at the time of termination. By the variable-length management method, a free area will turn into the next field of the field which the former communication control program gained inevitably to gain a field (field which is gained each time when some events occur) where other application programs (there may be a communication control program) are temporary in the meantime. Therefore, there was a problem of taking time amount as mentioned above, until it gains a buffer.

[0017] It becomes the following procedures when communication link application performs a buffer acquisition demand by this example.

1) Communication link application sets up a size pattern to a buffer assignment manager (the size pattern attaching part 4) (S1, S2). Here, suppose that it is the pattern of (P1=2KB, P2=4KB), for example.

[0018] 2) An application program specifies the size of a required buffer one after another, and requires a buffer.

3) As for the variable-length field Management Department 2 of a buffer assignment manager, only the size which received the demand assigns memory as a buffer (S3, S4). In addition, the variable-length field Management Department 2 hands the assigned size to the size pattern judging section 5.

[0019] 4) The size pattern judging section 5 stores temporarily the size of the buffer which the variable-length field Management Department 2 assigned, and compares with the size pattern of the size pattern attaching part 4 (S5, S6).

[0020] 5) When the size pattern judging section 5 judges with it not being in agreement, it is the same as the conventional variable-length management method. By drawing 1 and drawing 3, the application program which requires a buffer in single shot shows the condition of having gained two buffers (a buffer 1, buffer 2).

[0021] The communication link application of this example makes a group 2KB and 4KB of buffer, and requires many buffers continuously. Therefore, the variable-length field Management Department 2 judges with the size pattern judging section 5 being in agreement in the phase which assigned 2KB and 4KB of buffer (buffer P11 buffer P12) (S7).

[0022] When it judges with it being in agreement, the buffer of the part is passed to the fixed-length field Management Department 3 (S8). In drawing 3, the start address of that buffer (this

example buffer P11) is set as the head pointer F of the fixed-length field Management Department 3, and specifically, the contents (**) of degree pointer of the last variable-length buffer (this example buffer 2) are rewritten so that the start address (this example address just behind a buffer P12 (**)) of a free area may be shown. That is, in this example, two buffers, 2KB and 4KB, assigned immediately before are changed into fixed-length management, and degree pointer of the buffer in front of that flies these buffer areas, and points out the address of the next field.

[0023] In addition, when one is not assigning the buffer which is not in agreement with a size pattern, the contents of the head pointer F of the fixed-length field Management Department 3 are rewritten so that the start address of a buffer memory field may be shown. The head pointer V of the variable-length Management Department is rewritten to the start address of the field (free area) which was not changed into fixed-length management. Usually, there are many these cases.

[0024] If the fixed-length field Management Department 3 to which the management of a buffer area was transferred is not set up by then, it sets up a head pointer (S9, S10), and it sets up a flag (S11).

6) As for the variable-length field Management Department 2, only the size which received the demand assigns buffer memory similarly hereafter. And when it judges with the size pattern judging section being in agreement, the buffer of the part is passed to the fixed-length field Management Department 3. In drawing 3, the contents (**) of degree pointer of the buffer in front of the field the management of was transferred to fixed-length management are changed so that the start address (**) of a free area may be shown further.

[0025] Thus, if it finishes taking the buffer which needs communication link application, the variable-length field Management Department 2 will not participate in the buffer area which communication link application uses. Therefore, to other application programs which have required the buffer, a buffer can be immediately assigned to a free area after this.

[0026]

[Effect of the Invention] As explained above, according to this invention, many buffers are gained to a buffer area immediately after starting of a program etc., when a program which holds it just before termination, and a program which gains the field of magnitude various on real time exist in coincidence, the occupation of a buffer memory field can be reduced, time amount of buffer acquisition can be made quick, and the effectiveness that the execution speed as the whole improves can be expected.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the buffer allocation management equipment which assigns the buffer memory field on memory according to the demand of an application program, and the record medium which recorded the buffer allocation manager and in which computer reading is possible.

PRIOR ART

[Description of the Prior Art] A configuration which gives the buffer of size with which the application program which needs a buffer by the conventional buffer allocation management method to the buffer allocation manager which manages a buffer memory field carried out the buffer acquisition demand, and the buffer allocation manager was demanded is common. As a method which manages a buffer area, divide the memory area of which ** continuation was done, and two or more fixed-length fields are taken. The method which uses each of that field as a buffer, attaches use / intact flag corresponding to each buffer (fixed-length field), and manages a buffer (fixed-length management method: drawing 4 (1)), ** There is a method (variable-length management method: drawing 4 (2)) which will start a required part and will be given from the memory area prepared as a buffer area if there is a demand.

[0003] However, by the fixed-length management method, when a program operates by multitasking, the size of a buffer must be doubled with the application program which requires the largest buffer size. Therefore, in spite of using only small size in the case of most application programs, a buffer size must be made into the greatest size and buffer memory area size will also take it. [large] Therefore, the field of the memory which can be used will be pressed.

[0004] Moreover, in the case of a variable-length management method, by recording degree pointer (and the die length of a field) in which the start address of a buffer memory field is shown by the head pointer V as shown in drawing 5, and the start address of the display flag F in use in the head location of the buffer area started from there and the next field is shown shows a buffer continuously. Therefore, when another application program has required the buffer after assigning many buffers to a long application program which continues carrying out time amount maintenance for the field gained once, although there is no problem which makes a buffer area useless by the variable-length management method, since an empty buffer will be located in the degree of the field assigned once, although an empty buffer area is looked for, it needs to follow a chain, and requires time amount.

[0005] The above mentioned is a problem which appears well, when a communication control program operates in a multitasking environment as an application program.

EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, according to this invention, many buffers are gained to a buffer area immediately after starting of a program etc., when a program which holds it just before termination, and a program which gains the field of magnitude various on real time exist in coincidence, the occupation of a buffer memory field can be reduced, time amount of buffer acquisition can be made quick, and the effectiveness that the execution speed as the whole improves can be expected.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention aims at reconciling shortening the time amount of using a buffer area efficiently and buffer allocation by the buffer control partially made into a fixed-length management method by judging the pattern of the size of the buffer demanded on the basis of a variable-length management method.

MEANS

[Means for Solving the Problem] In the buffer allocation management equipment which has the buffer memory field which has a predetermined capacity on memory, and the variable-length field Management Department which assigns and manages the buffer of size according to the demand of an application program from the inside With the fixed-length field Management Department which manages the part as which it was specified in the buffer memory field as a fixed-length field The size pattern attaching part holding the pattern of the size of a buffer set up beforehand, When the variable-length field Management Department judges that the pattern of the size of a field assigned according to the demand of an application program is in agreement as compared with the pattern of a size pattern attaching part, The size pattern judging section which removes the assigned buffer memory field from the object of variable-length field management, and is passed to the fixed-length field Management Department is prepared.

[0008] Thus, by a variable-length management method's using a buffer memory field without futility to the buffer demand separately demanded by constituting, and removing from variable-length management and shifting to fixed-length management, when it judges that it is the size pattern set up to what takes many buffers by the pattern of fixed size, a field can be too used without futility rather than it decides the whole buffer size from the start. Moreover, the die length which follows the chain of a variable-length buffer when taking the buffer according to individual after that since the field which took many buffers by the same pattern is removed from the range of variable-length management becomes short, and since a free area can be found quickly, it can assign quickly.

[0009] Invention of claim 2 memorizes further the buffer size which assigned the size pattern attaching part whenever the variable-length field Management Department assigned the buffer, and the size pattern judging section is authorized as a size pattern, when the pattern of the memorized buffer size appears repeatedly, and it passes the fixed-length field Management Department the buffer area [finishing / allocation] suitable for a size pattern.

[0010] By doing in this way, an application program has the advantage which does not need to set up a size pattern first. Invention of claim 3 clarifies realizing by the program of a computer.

[0011] Namely, it is the record medium which recorded the buffer allocation manager for making the buffer assignment of a buffer memory field which has the predetermined capacity on memory manage by computer. Make the pattern of buffer size defined beforehand hold, and assign the buffer of size according to the demand of an application program from a buffer memory field, and it is made to manage as a variable-length field. When the pattern of the size of a field assigned according to the demand of an application program is made to compare with the pattern of buffer size with which the above is held and it is judged with coincidence as a result of

a comparison, It is the record medium which recorded the buffer quota manager characterized by making the assigned buffer area manage as a fixed-length field and in which computer reading is possible.

[0012]

[Embodiment of the Invention] Drawing 1 is the block diagram of an example and is drawing explaining the configuration and actuation of the buffer assignment management equipment which assigns the buffer which each application program requires in a computer to the field on memory, i.e., a buffer assignment manager.

[0013] To a buffer assignment manager, an application program 1 - n will advance a buffer acquisition demand, if a buffer is needed. The variable-length field Management Department 2 receives those demands, and they carry out layout management to the buffer memory field 1 with the conventional variable-length management method. The size pattern attaching part 4 holds the group (size pattern) of the size of a buffer. These contents can be set up separately. Although drawing 1 shows the example which constitutes a size pattern from two sizes, there may be how many sizes. Whenever the variable-length field Management Department 2 assigns a buffer, the size pattern judging section 5 memorizes the size, and compares with the size pattern of the size pattern attaching part 4. In addition, what is necessary is just to update the number of the sizes to memorize together with the number of maintenance sizes of a size pattern attaching part, so that it may leave the newest thing. When coincidence is detected, the fixed-length field Management Department 3 is started.

[0014] The case where also refer to the explanation flow chart of the example of drawing 2 of operation and the explanatory view of the example of drawing 3 of operation, and a buffer is hereafter assigned for the example of this invention to one of the application programs and a communication control program is explained.

[0015] In a communication control program, it is necessary to gain two or more fixed-length buffers for usually storing the data for outputting and inputting in a circuit in many cases. Since the maximum of a data length which can transmit at once by the circuit is restricted, it becomes two or more buffers which made the group control/management data, and a transmitted and received data. For example, the magnitude of the whole buffer memory field is about several MB, and one communication control program takes about several KB of about hundreds of buffers.

[0016] Generally, this field is gained, when self is started, and it is released at the time of termination. By the variable-length management method, a free area will turn into the next field of the field which the former communication control program gained inevitably to gain a field (field which is gained each time when some events occur) where other application programs (there may be a communication control program) are temporary in the meantime. Therefore, there was a problem of taking time amount as mentioned above, until it gains a buffer.

[0017] It becomes the following procedures when communication link application performs a buffer acquisition demand by this example.

1) Communication link application sets up a size pattern to a buffer assignment manager (the size pattern attaching part 4) (S1, S2). Here, suppose that it is the pattern of (P1=2KB, P2=4KB), for example.

[0018] 2) An application program specifies the size of a required buffer one after another, and requires a buffer.

3) As for the variable-length field Management Department 2 of a buffer assignment manager, only the size which received the demand assigns memory as a buffer (S3, S4). In addition, the

variable-length field Management Department 2 hands the assigned size to the size pattern judging section 5.

[0019] 4) The size pattern judging section 5 stores temporarily the size of the buffer which the variable-length field Management Department 2 assigned, and compares with the size pattern of the size pattern attaching part 4 (S5, S6).

[0020] 5) When the size pattern judging section 5 judges with it not being in agreement, it is the same as the conventional variable-length management method. By drawing 1 and drawing 3, the application program which requires a buffer in single shot shows the condition of having gained two buffers (a buffer 1, buffer 2).

[0021] The communication link application of this example makes a group 2KB and 4KB of buffer, and requires many buffers continuously. Therefore, the variable-length field Management Department 2 judges with the size pattern judging section 5 being in agreement in the phase which assigned 2KB and 4KB of buffer (buffer P11 buffer P12) (S7).

[0022] When it judges with it being in agreement, the buffer of the part is passed to the fixed-length field Management Department 3 (S8). In drawing 3, the start address of that buffer (this example buffer P11) is set as the head pointer F of the fixed-length field Management Department 3, and specifically, the contents (**) of degree pointer of the last variable-length buffer (this example buffer 2) are rewritten so that the start address (this example address just behind a buffer P12 (**)) of a free area may be shown. That is, in this example, two buffers, 2KB and 4KB, assigned immediately before are changed into fixed-length management, and degree pointer of the buffer in front of that flies these buffer areas, and points out the address of the next field.

[0023] In addition, when one is not assigning the buffer which is not in agreement with a size pattern, the contents of the head pointer F of the fixed-length field Management Department 3 are rewritten so that the start address of a buffer memory field may be shown. The head pointer V of the variable-length Management Department is rewritten to the start address of the field (free area) which was not changed into fixed-length management. Usually, there are many these cases.

[0024] If the fixed-length field Management Department 3 to which the management of a buffer area was transferred is not set up by then, it sets up a head pointer (S9, S10), and it sets up a flag (S11).

6) As for the variable-length field Management Department 2, only the size which received the demand assigns buffer memory similarly hereafter. And when it judges with the size pattern judging section being in agreement, the buffer of the part is passed to the fixed-length field Management Department 3. In drawing 3, the contents (**) of degree pointer of the buffer in front of the field the management of was transferred to fixed-length management are changed so that the start address (**) of a free area may be shown further.

[0025] Thus, if it finishes taking the buffer which needs communication link application, the variable-length field Management Department 2 will not participate in the buffer area which communication link application uses. Therefore, to other application programs which have required the buffer, a buffer can be immediately assigned to a free area after this.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram of an example

[Drawing 2] The explanation flow chart of an example of operation

[Drawing 3] The explanatory view of an example of operation

[Drawing 4] The conventional buffer allocation managed explanatory view

[Drawing 5] The explanatory view of variable-length management

[Description of Notations]

1 Buffer Memory Field

2 Variable-length Field Management Department

3 Fixed-length Field Management Department

4 Size Pattern Attaching Part

5 Size Pattern Judging Section

乙第12号証

(19)日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11)特許出願公開番号

特開平10-69429

(43)公開日 平成10年(1998)3月10日

(51) Int.Cl.⁸
G 06 F 12/02

識別記号
5 4 0

府内整理番号
F I
G 06 F 12/02

技術表示箇所
5 4 0

審査請求 未請求 請求項の数3 O.L (全7頁)

(21)出願番号 特願平9-89497
(22)出願日 平成9年(1997)4月8日
(31)優先権主張番号 特願平8-86096
(32)優先日 平8(1996)4月9日
(33)優先権主張国 日本 (JP)

(71)出願人 000005223
富士通株式会社
神奈川県川崎市中原区上小田中4丁目1番
1号
(71)出願人 000136136
株式会社ピーエフユー
石川県河北郡宇ノ気町字宇野気ヌ98番地の
2
(72)発明者 田辺 恒太
東京都稻城市大字大丸1405番地 株式会社
富士通パソコンシステムズ内
(74)代理人 弁理士 井桁 貞一

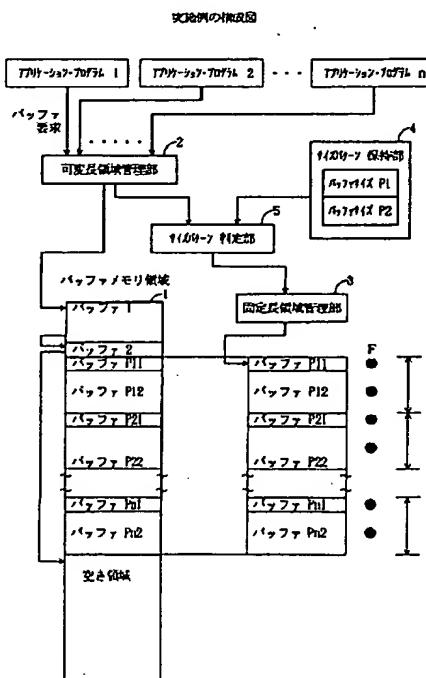
最終頁に続く

(54)【発明の名称】 バッファ割当て管理装置およびバッファ割当て管理プログラム

(57)【要約】

【課題】メモリ上のバッファメモリ領域を割り当てるバッファ割当て管理装置に関し、バッファ領域を効率よく使用し、バッファ割当ての時間を短縮する。

【解決手段】メモリ上に所定の容量を有するバッファメモリ領域と、その内からアプリケーション・プログラムの要求に応じたサイズのバッファを割り当てる可変長領域管理部とを有するバッファ割当て管理装置であって、バッファメモリ領域内の指定された部分を固定長領域として管理する固定長領域管理部と、あらかじめ定められた、バッファのサイズのパターンを保持するサイズパターン保持部と、可変長領域管理部がアプリケーション・プログラムの要求に応じて割り当てる領域のサイズのパターンを、サイズパターン保持部のパターンと比較し、一致すると判定したとき、割り当てるバッファメモリ領域を固定長領域管理部に渡すサイズパターン判定部とを有するように構成する。



【特許請求の範囲】

【請求項1】 メモリ上に所定の容量を有するバッファメモリ領域と、その内からアプリケーション・プログラムの要求に応じたサイズのバッファを割り当て管理する可変長領域管理部とを有するバッファ割り当て管理装置であって、

バッファメモリ領域内の指定された部分を固定長領域として管理する固定長領域管理部と、

あらかじめ定められた、バッファのサイズのパターンを保持するサイズパターン保持部と、

可変長領域管理部がアプリケーション・プログラムの要求に応じて割り当てた領域のサイズのパターンを、サイズパターン保持部のパターンと比較し、一致すると判定したとき、割り当てたバッファメモリ領域を可変長領域管理の対象からははずし固定長領域管理部に渡すサイズパターン判定部とを有することを特徴とするバッファ割り当て管理装置。

【請求項2】 請求項1に記載のバッファ割り当て管理装置であって、

サイズパターン保持部は、可変長領域管理部がバッファを割り当てるごとに割り当てたバッファサイズを記憶し、

サイズパターン判定部は記憶されたバッファサイズのパターンが繰り返し現れるときサイズパターンとして認定し、サイズパターンに合った割り当て済のバッファ領域を固定長領域管理部に渡すことを特徴とするバッファ割り当て管理装置。

【請求項3】 コンピュータによって、メモリ上の所定容量を有するバッファメモリ領域のバッファ割り当てを管理させるためのバッファ割り当て管理プログラムを記録した記録媒体であって、

あらかじめ定められた、バッファサイズのパターンを保持させ、

アプリケーション・プログラムの要求に応じたサイズのバッファをバッファメモリ領域から割り当てて可変長領域として管理させ、

アプリケーション・プログラムの要求に応じて割り当てられた領域のサイズのパターンと、前記の保持されているバッファサイズのパターンとを比較させ、比較の結果一致と判定されるとき、割り当てられたバッファ領域を固定長領域として管理させることを特徴とするバッファ割り当て管理プログラムを記録したコンピュータ読み取り可能な記録媒体。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明はメモリ上のバッファメモリ領域をアプリケーション・プログラムの要求に応じて割り当てるバッファ割り当て管理装置、およびバッファ割り当て管理プログラムを記録したコンピュータ読み取り可能な記録媒体に関する。

【0002】

【従来の技術】 従来のバッファ割り当て管理方式では、バッファメモリ領域を管理するバッファ割り当て管理プログラムに対して、バッファを必要とするアプリケーション・プログラムがバッファ獲得要求をし、バッファ割り当て管理プログラムが要求されたサイズのバッファを与えるような構成が一般的である。バッファ領域を管理する方式として、①連続したメモリ領域を分割して固定長の領域を複数とり、その各領域をバッファとし、各バッファ（固定長領域）に対応して使用／未使用のフラグをつけてバッファの管理を行う方式（固定長管理方式：図4（1））と、②バッファ領域として用意されたメモリ領域から、要求があると要求分だけ切り出して与える方式（可変長管理方式：図4（2））とがある。

【0003】 しかし、固定長管理方式では、マルチタスクでプログラムが動作する場合、バッファのサイズは、最も大きいバッファサイズを要求するアプリケーション・プログラムに合わせざるを得ない。そのため、大抵のアプリケーション・プログラムの場合には小さいサイズしか使わないにもかかわらず、バッファの大きさは最大のサイズにしなければならず、バッファメモリ領域の大きさも大きくとることになる。従って、使えるメモリの領域が圧迫されることになる。

【0004】 また、可変長管理方式の場合、図5に示すように先頭ポインタVによりバッファメモリ領域の先頭アドレスが示され、そこから切り出したバッファ領域の先頭位置に使用中の表示フラグFと次の領域の先頭アドレスを示す次ポインタと（および領域の長さ）を記録することにより連鎖的にバッファを示す。従って、可変長管理方式ではバッファ領域を無駄にする問題は無いが、一度獲得した領域を長い時間保持し続けるようなアプリケーション・プログラムに多数のバッファを割り当てた後に、別のアプリケーション・プログラムがバッファを要求してきた場合、空きバッファは一度割り当てられた領域の次に位置することになるので、空きバッファ領域を探すのには連鎖をたどる必要があり時間がかかる。

【0005】 以上のようなことは、例えば、アプリケーション・プログラムとして通信制御プログラムがマルチタスク環境で動作する場合によく現れる問題である。

【0006】

【発明が解決しようとする課題】 本発明は、可変長管理方式を基本とし、要求されるバッファのサイズのパターンを判断することにより部分的に固定長管理方式とするバッファ管理により、バッファ領域を効率よく使用することとバッファ割り当ての時間を短縮することとを両立させることを目的としている。

【0007】

【課題を解決するための手段】 メモリ上に所定の容量を有するバッファメモリ領域と、その内からアプリケーション・プログラムの要求に応じたサイズのバッファを割

り当て管理する可変長領域管理部とを有するバッファ割当て管理装置において、バッファメモリ領域内の指定された部分を固定長領域として管理する固定長領域管理部と、あらかじめ設定された、バッファのサイズのパターンを保持するサイズパターン保持部と、可変長領域管理部がアプリケーション・プログラムの要求に応じて割り当てた領域のサイズのパターンを、サイズパターン保持部のパターンと比較し、一致すると判定したとき、割り当てたバッファメモリ領域を可変長領域管理の対象からはずし固定長領域管理部に渡すサイズパターン判定部とを設ける。

【0008】このように構成することにより、個々に要求してくるバッファ要求に対しては可変長管理方式により無駄なくバッファメモリ領域を使い、固定的なサイズのパターンで多くのバッファを取るものに対しては、設定されているサイズパターンであると判断したとき、可変長管理から外して固定長管理に移すことにより、始めから全体のバッファサイズを決めておくよりも、やはり領域を無駄なく使用できる。また、同じパターンで多くのバッファをとった領域は可変長管理の範囲からはずされるので、その後に個別のバッファをとる場合に可変長バッファの連鎖をたどる長さが短くなり、空き領域を速く見つけることができるので速く割り当てることができる。

【0009】請求項2の発明は、さらに、サイズパターン保持部は、可変長領域管理部がバッファを割り当てるごとに割り当てたバッファサイズを記憶し、サイズパターン判定部は記憶されたバッファサイズのパターンが繰り返し現れるときサイズパターンとして認定し、サイズパターンに合った割当て済のバッファ領域を固定長領域管理部に渡す。

【0010】このようにすることにより、アプリケーション・プログラムは、サイズパターンを始めに設定しなくてもよい利点がある。請求項3の発明は、コンピュータのプログラムにより実現することを明確にしたものである。

【0011】すなわち、コンピュータによって、メモリ上の所定容量を有するバッファメモリ領域のバッファ割り当てを管理させるためのバッファ割り当て管理プログラムを記録した記録媒体であって、あらかじめ定められた、バッファサイズのパターンを保持させ、アプリケーション・プログラムの要求に応じたサイズのバッファをバッファメモリ領域から割り当てて可変長領域として管理させ、アプリケーション・プログラムの要求に応じて割り当てられた領域のサイズのパターンと、前記の保持されているバッファサイズのパターンとを比較させ、比較の結果一致と判定されると、割り当てられたバッファ領域を固定長領域として管理させることを特徴とするバッファ割り当て管理プログラムを記録したコンピュータ読み取り可能な記録媒体である。

【0012】

【発明の実施の形態】図1は、実施例の構成図であり、コンピュータにおいて個々のアプリケーションプログラムが要求するバッファをメモリ上の領域に割り付けるバッファ割り付け管理装置、すなわちバッファ割り付け管理プログラムの構成および動作を説明する図である。

【0013】アプリケーション・プログラム1～nは、バッファ割り付け管理プログラムに対して、バッファが必要になるとバッファ獲得要求を出す。それらの要求は可変長領域管理部2が受け、従来の可変長管理方式によりバッファメモリ領域1に割りつけ管理する。サイズパターン保持部4はバッファのサイズの組（サイズパターン）を保持する。この内容は別途設定できる。図1では2つのサイズでサイズパターンを構成する例を示しているが、幾つのサイズがあってもよい。可変長領域管理部2がバッファを割りつけることにサイズパターン判定部5はそのサイズを記憶し、かつ、サイズパターン保持部4のサイズパターンと比較する。なお、記憶するサイズの数はサイズパターン保持部の保持サイズ数と合わせ、最

10 新のものを残すように更新すればよい。一致を検出したときは固定長領域管理部3を起動する。

【0014】以下、図2の実施例の動作説明フローチャート、図3の実施例の動作説明図も参照して本発明の実施例をアプリケーション・プログラムの一つ、通信制御プログラムに対してバッファを割り付ける場合を説明する。

【0015】通信制御プログラムにおいて、複数の固定長のバッファを獲得する必要があるのは、通常、回線に入出力する為のデータを格納するためのものであることが多い。回線により一度に送信できるデータ長の最大値が制限されるため、制御／管理データと送受信データとを組にした複数のバッファになる。例えば、バッファメモリ領域全体の大きさは数MB程度であり、1つの通信制御プログラムは数KB程度のバッファを数百個程度とする。

【0016】この領域は、一般的に、自身が起動された時に獲得し、終了の時に解放する。可変長管理方式では、この間に他のアプリケーション・プログラム（通信制御プログラムの場合もある）が一時的な領域（何か事象が発生した時にその都度獲得するような領域）を獲得したい場合、空き領域は必然的に以前の通信制御プログラムが獲得した領域の次の領域になってしまふ。そのため、前述したようにバッファを獲得するまでの時間がかかるという問題があった。

【0017】本実施例で通信アプリケーションがバッファ獲得要求を行う場合、以下の手順となる。

1) 通信アプリケーションは、バッファ割り付け管理プログラム（そのサイズパターン保持部4）に対して、サイズパターンを設定する(S1,S2)。ここでは、例えば、(P1=2KB, P2=4KB)のパターンであるとする。

50

【0018】2) アプリケーションプログラムは、次々に必要なバッファのサイズを指定してバッファを要求する。

3) バッファ割付管理プログラムの可変長領域管理部2は要求を受けたサイズだけメモリをバッファとして割りつける(S3,S4)。なお、可変長領域管理部2は、割りつけたサイズをサイズパターン判定部5に渡す。

【0019】4) サイズパターン判定部5は、可変長領域管理部2が割りつけたバッファのサイズを一時記憶しておき、サイズパターン保持部4のサイズパターンと比較する(S5,S6)。

【0020】5) サイズパターン判定部5が、一致していないと判定したときは、従来の可変長管理方式と同じである。図1および図3では単発的にバッファを要求するアプリケーション・プログラムが2つのバッファ(バッファ1、バッファ2)を獲得した状態を示す。

【0021】この例の通信アプリケーションは、2KBと4KBのバッファを組にして多数のバッファを連続して要求する。従って、可変長領域管理部2が2KBと4KBのバッファ(バッファP11 バッファP12)を割りつけた段階で、サイズパターン判定部5は一致していると判定する(S7)。

【0022】一致していると判定した場合は、その分のバッファを固定長領域管理部3に渡す(S8)。具体的には、図3において、固定長領域管理部3の先頭ポインタFに、そのバッファ(この例ではバッファP11)の先頭アドレスを設定し、直前の可変長バッファ(この例ではバッファ2)の次ポインタの内容(①)を空き領域の先頭アドレス(この例ではバッファP12の直後のアドレス(②))を示すように書き直す。すなわち、この例では、直前に割りつけた2KBと4KBの2つのバッファは固定長管理に変更され、その直前のバッファの次ポインタはこれらのバッファ領域をとばして次の領域のアドレスを指す。

【0023】なお、サイズパターンに一致しないバッファを1つも割りつけていない場合は固定長領域管理部3の先頭ポインタFの内容をバッファメモリ領域の先頭アドレスを示すように書き直す。可変長管理部の先頭ポインタVは固定長管理に変更されなかった領域(空き領

域)の先頭アドレスに書き直す。通常はこの場合が多い。

【0024】バッファ領域を移管された固定長領域管理部3は、それまでに設定されていなければ先頭ポインタを設定し(S9,S10)、フラグを設定する(S11)。

6) 以下、同様にして可変長領域管理部2は要求を受けたサイズだけバッファメモリを割りつける。そして、サイズパターン判定部が一致していると判定した場合は、その分のバッファを固定長領域管理部3に渡す。図3において、固定長管理に移管された領域の直前のバッファの次ポインタの内容(②)をさらに空き領域の先頭アドレス(③)を示すように変更する。

【0025】このようにして、通信アプリケーションが必要なバッファを取り終わると、可変長領域管理部2は通信アプリケーションが使うバッファ領域には関与しないことになる。従って、この後、バッファを要求してきた他のアプリケーション・プログラムに対しては、すぐに空き領域にバッファを割りつけることができる。

【0026】

20 【発明の効果】以上説明したように、本発明によれば、プログラムの起動直後等にバッファ領域に多くのバッファを獲得し、終了直前までそれを保持するようなプログラムと、リアルタイムにまちまちな大きさの領域を獲得するようなプログラムが同時に存在する場合に、バッファメモリ領域の占有量を削減し、バッファ獲得の時間を速くすることができ、全体としての実行速度が向上するという効果が期待できる。

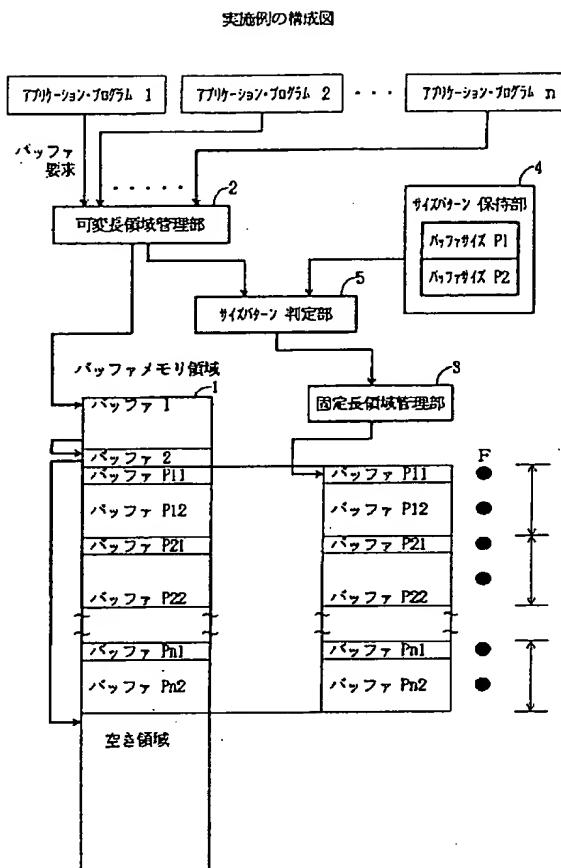
【図面の簡単な説明】

- 【図1】 実施例の構成図
- 30 【図2】 実施例の動作説明フローチャート
- 【図3】 実施例の動作説明図
- 【図4】 従来のバッファ割当て管理説明図
- 【図5】 可変長管理の説明図

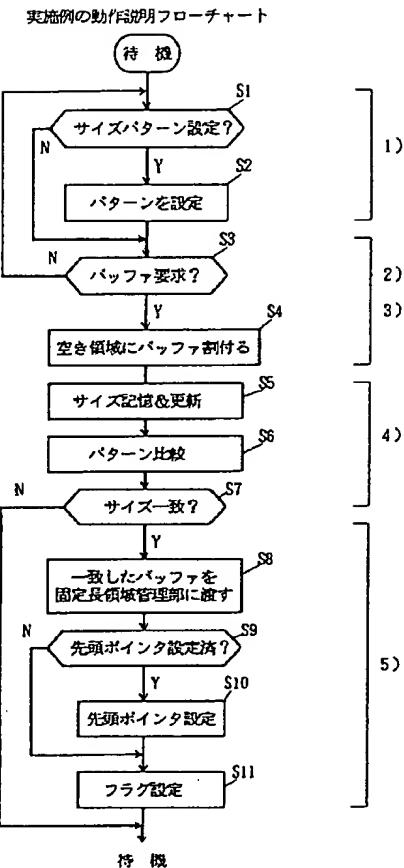
【符号の説明】

- 1 バッファメモリ領域
- 2 可変長領域管理部
- 3 固定長領域管理部
- 4 サイズパターン保持部
- 5 サイズパターン判定部

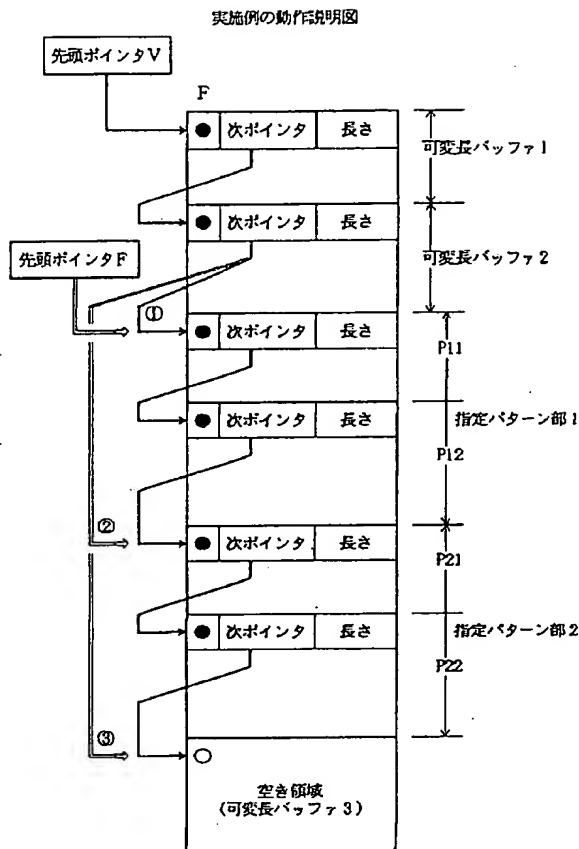
【図1】



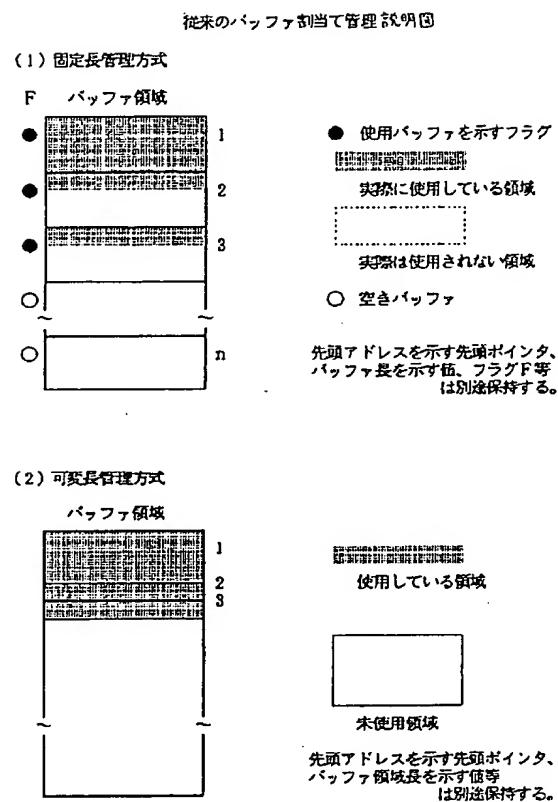
【図2】



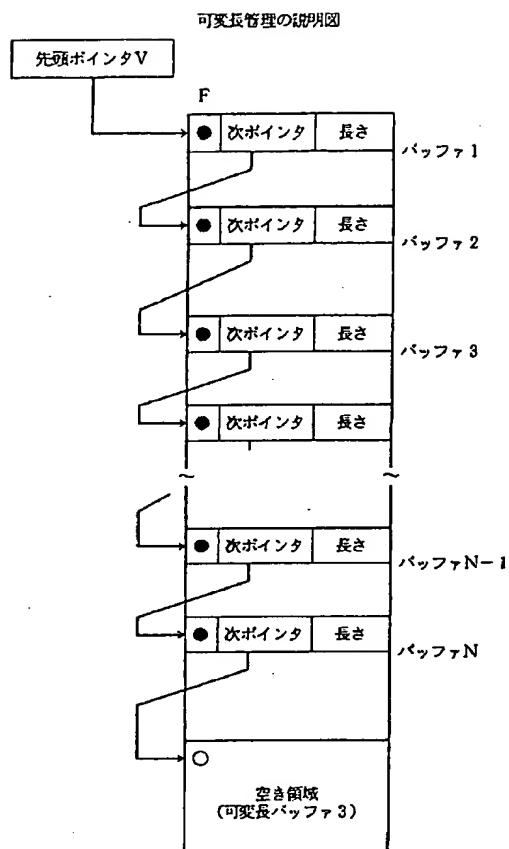
【図3】



【図4】



【図5】



フロントページの続き

(72)発明者 古川 智章
石川県河北郡宇ノ気町字宇野気ヌ98番地の
2 株式会社ビーエフユー内